

In his monograph of the Palaearctic Orneodidae, Dr. O. Hofmann remarked :—

“The genus *Deuteroscopus* from Java, with three lobes to the forewing, which Zeller (Lin. Ent., vi, p. 402) on its foundation alleged to have a relationship with the *Orneodidae*, is according to investigation of its neuration a typical Pterophorid standing next to the genus *Oxyptilus*, Z. The cleft of the lower segment of the forewing is only a continuation, stretching deeper into the wing-membrane, of the forking which in *Oxyptilus* is found between the extended branches III<sup>2</sup> of the Medius [vein 4] and IV<sup>1</sup> of the Cubitus [vein 3]. Also the club-scales on the branches of the Cubitus of the hindwing, characteristic of the *Pterophoridae*, are in *Deuteroscopus* also present and indeed in two rows on the base of both branches, only in one row beyond that in the periphery itself.”

In these observations Dr. Hofmann was perfectly correct—except for his misquotation of the name of the genus—and I quite agree that *Deutero copus* may be regarded as an offshoot from the Oxyptiline stem.

In “*Spolia Zeylanica*,” vol. vi, pp. 16–17, I made some remarks on the Sinhalese members of the genus, but at that time I had concluded that the different forms occurring in Ceylon all belonged to one highly variable species. This is an opinion which I have now seen reason to alter, and my previous remarks under this heading must be considered as cancelled.

The following characters are now given as a revised definition of the genus :—

Labial palpi upturned, third joint about  $\frac{1}{2}$  length of second. Haustellum developed. Antennae moderate, minutely ciliated in ♂. Head with erected scales on crown. Abdomen short, thickset, third segment usually edged posteriorly with a raised band of scales. Foretibia with apical scale-tuft, mid-tibia with a scale-tuft and pair of spurs at apex, hind-tibia very stout with a moderate whorl of scales near base and two large whorls, first beyond half, second apical, each emitting a pair of very long spurs, posterior tarsi with small whorls of spinous hairs on apex of two basal joints. Forewing moderately broad, cleft from about  $\frac{2}{3}$ , second segment again cleft, subsegments at least half length of second segment. Hindwing cleft from about  $\frac{2}{3}$  and from near base, segments linear, third segment with large apical scale-tooth and smaller tooth on dorsal margin at about half. Neurulation :—Forewing : 2 from lower edge of cell, 3 and 4 from beneath base of first cleft, 5 and 6 very short or absent, 7 from above

main cleft to hinder-margin of first segment near apex, 8 and 9 long-stalked, 10 from near angle of cell, 11 from near 10, 12 into costa before cleft. Hindwing: 1<sup>b</sup> to apex of third segment, 2 from middle of cell, short, 3 absent, 4 to apex of second segment, 5 and 6 very short or absent, 7 to apex, 8 into costa at about half. Spina of frenulum single in ♀.

SYNOPSIS OF SPECIES OF DEUTEROCOPUS.

1.	{	Blackish species, f.w. and abdomen without any ferruginous-orange markings . . . . .	2
		Not blackish species, f.w. and abdomen with ferruginous-orange markings . . . . .	3
2.	{	Costa of f.w. with scale-tuft at about $\frac{2}{3}$ . . . . .	<i>melanota</i>
		Costa of f.w. without scale-tuft at about $\frac{2}{3}$ . . . . .	<i>famulus</i>
3.	{	Pectus and venter whitish . . . . .	4
		Pectus and venter pale-yellowish . . . . .	9
4.	{	Second cleft only about $\frac{1}{2}$ length of first . . . . .	5
		Second cleft at least $\frac{2}{3}$ length of first . . . . .	6
5.	{	Dorsum of f.w. with a small black scale-tuft beneath base of first cleft . . . . .	<i>trapez</i>
		Dorsum of f.w. without scale-tuft beneath base of first cleft . . . . .	<i>tengstroemi</i>
6.	{	Costa of f.w. with tuft of scales at about $\frac{2}{3}$ . . . . .	<i>lophopteryx</i>
		Costa of f.w. without tuft of scales at about $\frac{2}{3}$ . . . . .	7
7.	{	Dorsum of f.w. with dark scale-tuft beneath base of first cleft . . . . .	8
		Dorsum of f.w. without dark scale-tuft beneath base of first cleft . . . . .	<i>albipunctatus</i>
8.	{	Expanse 10 mm.; posterior tarsi ringed with whitish or paler . . . . .	<i>socotranus</i>
		Expanse 12 mm.; posterior tarsi unicolorous golden-ferruginous . . . . .	<i>bathychasma</i>
9.	{	Second cleft $\frac{2}{3}$ length of first; no scale-tuft in dorsal cilia of f.w. beneath base of first cleft . . . . .	<i>planeta</i>
		Second cleft less than $\frac{2}{3}$ (usually about $\frac{1}{2}$ ) length of first; a dark scale-tuft in dorsal cilia of f.w. beneath base of first cleft . . . . .	<i>ritsemæ</i> (including <i>rubrodactylus</i> )

*Deuterocopus famulus*, Meyr.

(Plate XLIV, fig. 2.)

*Deuterocopus famulus*, Meyrick, T.E.S., 1907, 474.

“ ♀. 15 mm. Head, palpi and antennae [evidently a *lapsus calami* for ‘thorax’] dark coppery-fuscous with a few white scales.

Antennae dark-fuscous. Abdomen blackish-fuscous, first segment white except a dorsal stripe, second segment wholly ochreous-white, third ochreous-white on sides, ventral surface wholly ochreous-white. Legs dark coppery-fuscous, anterior and middle pairs lined and sprinkled with white, posterior tibiae banded with white, with expansible whorls of scales on origin of spurs (tarsi broken). Forewings cleft firstly from before  $\frac{2}{3}$ , second segment cleft from its middle; dark prismatic coppery-fuscous; a few irregularly scattered white scales: cilia fuscous, towards apex of segments suffused with dark-fuscous, beneath apex of first and second segments with a slender white bar, on dorsum with a white space extending from middle to  $\frac{2}{3}$ , including a central fuscous bar. Hindwings cleft firstly from  $\frac{2}{3}$ , secondly from  $\frac{1}{2}$ , segments slender; dark-fuscous; a pellucid streak in disc; two or three white scales in middle of third segment; cilia pale prismatic purplish-fuscous, darker towards tips of segments, apex of third segment with a small projection of black scales above and beneath.

“KEI ISLANDS, in May; one specimen.”

I have examined three examples of this species in the collection of Lord Walsingham. They are labelled:—Fergusson Id., D'Eutrecasteaux Is., 8-30, ix, 1894, Meek, No. 17328; Patani, HALMAHERA, Doherty 1897, No. 41960; and BATIAN, viii, 1897, Doherty, No. 41948.

*Deuterocopus melanota*, n. s.

(Plate XLIV, fig. 3.)

*Deuterocopus melanota*, Wlsm., MS. (*ined.*)

♂. Expanse 11 mm. Palpi erect, smoothly scaled, third joint filiform, acuminate, shorter than second; greyish-white, banded with brown at joints and at apex. Antennae brown, dotted with whitish above. Head dark-brown, sprinkled with whitish; some anteriorly-erected scales on top of crown. Thorax blackish-brown sprinkled with greyish-ochreous; pectus whitish. Abdomen blackish-brown, sprinkled with greyish-ochreous especially towards base; second segment with two short submedian posteriorly-divergent whitish streaks, apex of segment edged with a few scattered whitish scales; apex of third segment edged with a raised band of ochreous-whitish scales intermixed with blackish-brown; fifth segment with a pair of whitish submedian dots separated by a darker space; anal tuft long, blackish-brown; venter whitish, fourth segment crossed

by a blackish-brown bar. Foreleg fuscous-brown: tibia short and thickened with scales; tarsus whitish, banded with blackish-brown in middle and at apex. (Midlegs broken.) Hindleg blackish-brown: tibia with slight whorl of scales at  $\frac{1}{3}$  and moderate whorls at  $\frac{2}{3}$  and apex, broadly lined with whitish at base and below whorls; tibial spurs strongly-developed, dark-brown, whitish in centre and at apex, posterior edges roughly haired, spurs of proximal pair longer than those of distal pair; tarsus blackish-brown, apices of joints with gradually decreasing clusters of spinous hairs, first tarsal joint broadly lined with white above, third tarsal joint suffused with greyish.

Forewing cleft from within  $\frac{2}{5}$ , segments narrow, second segment again cleft from about  $\frac{1}{4}$  of its length, subsegments linear: blackish-coppery-brown, irrorated with whitish-ochreous: a narrow whitish subdorsal dash at  $\frac{1}{4}$ , a broad whitish subcostal spot at about  $\frac{1}{2}$  reaching nearly to dorsum but separated from base of cleft by a narrow black interval; first segment cut at about  $\frac{1}{3}$  and  $\frac{2}{3}$  by ill-defined whitish bars of which the inner is the more distinct; first and second subsegments with a few whitish scales a little beyond  $\frac{1}{2}$ . Cilia on costa blackish-brown with a conspicuous projecting tuft of black hair-scales above base of first cleft and slight tufts of black hair-scales at about  $\frac{1}{3}$ ; at apex black; on hinder-margin of first segment brownish, black from about  $\frac{2}{5}$  length of segment to just before apex, beneath apex greyish-ochreous, base of cilia black and forming a small posteriorly-projecting tooth; on fore-margin of second segment blackish-brown, beyond  $\frac{1}{2}$  black; on apex of first subsegment greyish-ochreous; on hinder-margin of first subsegment greyish-ochreous, blackish beyond  $\frac{1}{2}$  to just before apex, beneath apex a small posteriorly-projecting scale-tooth; on fore-margin of second subsegment blackish-brown to  $\frac{1}{2}$ , beyond that blackish; on apex of second subsegment greyish-ochreous; on dorsum greyish-ochreous, with a small black scale-tooth at about  $\frac{2}{3}$  (beneath base of first cleft), beyond  $\frac{2}{3}$  blackish-brown, beneath tornus a small black posteriorly-projecting scale-tuft.

Hindwing cleft from  $\frac{2}{5}$  and from near base, segments linear; blackish-coppery. Cilia blackish-brown, on hinder-margin of second segment greyish-ochreous at about  $\frac{1}{2}$ , third segment with a large spatulate tooth of black scales occupying exterior fourth of both margins and a small black scale-tooth on dorsum slightly within  $\frac{1}{2}$ .

TYPE ♂ (No. 42101) in Walsingham Coll.; Perak (3000 feet), October 1890 (*Doherty*).

*Deutero copus tengstroemi*, Zell.

(Plate XLIV, fig. 4.)

*Deutero copus tengstroemi*, Zeller, Linn. Ent., vi, 402-404 (1852); Zeller, Bull. Soc. Imp. Nat. Mosc., xxvi, pt. ii, t. iv, ff. 17-20, p. 516; Walker, Cat., xxx, 951 (1864).

*nec*

Meyrick, T.E.S., 1886, 8; Pagenstecher, Abh. Ges. Zool., xxix, 241 (? *atrapex*); Meyr., J. Bombay N. H. Soc., xvii, 134 (= *socotranus*, Rbl.); Meyr., T.E.S., 1907, 474 (= *atrapex*, Fletcher); Fletcher, Spol. Zeylan., vi, 16-17, 18, 19-20 (1909) (= *socotranus*, Rbl.); Maxwell-Lefroy, Indian Insect Life, p. 528 (1909).

The following is a translation of Zeller's original description:—

“Body and wings ferruginous, cilia of the latter spotted with fuscous; third segment of hindwing with black scaling in middle of dorsum and around apex (♂ ♀).

“Size of a small *Pt. obscurus*. Body and wings rust-yellow, the former rather shining and somewhat browned on the thorax. Antenna in ♀ only half-length of forewing, moderately thick, ringed with white and brown, basally white above; antenna of ♂ somewhat longer, less ringed, above dilated and with broader white markings; terminal joint somewhat thickened, apex acuminate. The hairs on the hinder margin of the head erected and inclined forwards. Palpi as long as the head, moderately thin, horizontal; the terminal joint pointed, white above, before the tip and on the underside yellow-brown. Haustellum yellowish, as long as the thorax. Pectus white-spotted on the side. Venter white, the edges of the first two segments with small rust-yellow bands enlarged laterally. Forelegs rather shining on the femora and base of tibia; the end of the tibia is thickened knottily with unequally-long, very plentiful, rust-brown scales; out of the knots project the long whitish spurs, blackish on one side; the tarsi are whitish above, the first joint thickened apically with scales and black, the three following not densely scaled beneath, the two last suffused with black. In the second pair of legs the tip of the tibia is only slightly thickened, the tarsi whitish blackened at the tip. [N.B.—By some error Zeller has evidently transposed the descriptions of the fore- and mid-legs, and this must be borne in mind when reading the above translation.—T.B.F.] In the posterior legs the tibiae are extraordinarily thick, with three thickenings; the

weakest is near the base; the second is strong, ruffled up in the shape of a funnel, sprinkled with brown at its base, and is situated at the root of the first pair of spurs; the third is still stronger and longer, is likewise ruffled up and thickly suffused with blackish and is situated at the extremity of the tibia: the upper pair of spurs reaches somewhat beyond the extremity of the tibia and is thickened with hairs, rusty-yellow on one side, on the other white and blackish-brown at the tip; the second pair of spurs is as long as the first two tarsal joints and is also hairy on one side, rusty-yellow, black at the root and in the middle, and at the tip white with a small black spot. The first three tarsal joints are rusty-yellow, the first with a somewhat weak apical hair-funnel, the second with a weaker hair-funnel white apically, the third with a still weaker brown hair-funnel; the last two joints are black.

“Forewings  $2\frac{1}{2}$  to  $2\frac{1}{3}$  lines long, moderately slender; the fissure stands somewhat separated. The first segment, which is almost half as long as the wing, is brown and strewn longitudinally with blackish scales. A bright yellowish transverse streak cuts off the beginning of the darkening to a narrow bar. The costal cilia are bright rust-yellow with three black longitudinal streaks at equal distances up to the apex. The yellowish inner-marginal cilia are blackish at the mouth of the fissure; between these places and the black streak coming out to the tip of the wing the fringes are light-yellow on the blackish edge-line. The second segment is browned on its outer three-fourths, darker than the first segment; at its middle it splits into two divergent, linear subsegments, of which the anterior is the longer; the cilia of both subsegments are of the extremest pale-yellow at the tip; moreover, the first subsegment is black-fringed at the extremity of its fore-margin and also on the inner half of its lower-margin; and all the cilia of the second subsegment are also so coloured; but both these subsegments have black scales at their apices at the base of the pale cilia.

“The first two segments of the hindwing are cleft up to three-fourths of the wing-length; they are faintly browned posteriorly and the lower margin of the second segment has the palest yellowish cilia. The third segment is so extraordinarily short that it only reaches a little beyond the cleft between the first two segments; it is very slender, and has in the middle of the dorsal margin a small deep-black scale-tuft, and at its apex is edged with a large rounded black scale-spot enclosing both margins.

“Underside coloured almost like the upperside.

“*Habitat*.—Java. I have named the species after its discoverer, Herr J. af Tengström, the author of the ‘*Bidrag till Finlands Fjäril-Fauna*.’”

In the following year Zeller published figures of this species, but without any text beyond description, in Bull. Soc. Nat. Moscou. Figure 17 shows the whole insect, but it is to be noted that the second segment is here shown as cleft from about  $\frac{1}{4}$ , whereas figure 20 (which gives a more enlarged view of two wings) shows this cleft from  $\frac{1}{2}$  only in accordance with the description. Figures 18 and 19 show the mid- and hind-leg.

The following is a redescription of one of Zeller's original specimens of *D. tengstroemi*, now preserved in Lord Walsingham's collection. It is labelled "Java, Tengstr." and also "Type 2/2":—

♀. Expanse 12 mm. Palpi long, slender, semi-erect, pale-ferruginous; second joint very slightly dilated at apex, where it is banded with dark-ferruginous; third joint slightly over half length of second, acuminate, broadly banded with dark-ferruginous at base and apex. Antennae dark-ferruginous, dotted with whitish above. Head light-ferruginous, top of crown with long anteriorly-erected scales. Thorax light-ferruginous; pectus marked with whitish. Abdomen stout, light-ferruginous with traces of whitish submedian spots on second segment, and of a narrow transverse white band along posterior edge of third segment; ventral surface white, mottled on sides with ferruginous-golden, fourth segment margined posteriorly with ferruginous-golden. Foreleg whitish-ferruginous, tibia with apical scale-tuft of darker ferruginous scales (but no "white spines"). Midleg whitish-ferruginous, tibia with apical scale-tuft of darker-ferruginous scales (spurs broken). [Hindlegs missing.]

Forewing cleft from rather within  $\frac{2}{3}$ , first segment moderately broad with slight hinder-angle, second segment expanded posteriorly and again cleft to one-half of its own length, subsegments linear, first parallel to first segment, divergent from second: bright ferruginous-golden slightly suffused with light ferruginous: first segment lightly suffused with ferruginous except on costa at  $\frac{1}{4}$  length of segment, cut at about  $\frac{2}{3}$  by a nearly obsolete inwardly-oblique whitish line; second segment lightly suffused with ferruginous, first subsegment with a minute whitish dot near base. Cilia on costa light-ferruginous, slightly darker on base of first segment, on first segment black at  $\frac{2}{3}$  as a slight bar, with slight blackish admixture at  $\frac{2}{3}$  and  $\frac{4}{5}$ ; at apex black; on hinder-margin of first segment whitish-ochreous from  $\frac{2}{3}$  to immediately before hinder-angle blackish-ferruginous, a hinder-angle a small blackish wisp preceded by a very narrow ferruginous wisp, on termen pale-ferruginous with a blackish basal line; on fore-margin of second segment whitish-ochreous, beyond  $\frac{2}{3}$

blackish-ferruginous, at apex of first subsegment whitish-ochreous with a broad blackish basal line surrounding apex of subsegment and forming a very small posteriorly-directed scale-tooth; on hinder-margin of first subsegment dark-ferruginous to  $\frac{1}{2}$ , beyond  $\frac{1}{2}$  whitish-ochreous; on fore-margin of second subsegment dark-ferruginous to  $\frac{1}{2}$ , beyond  $\frac{1}{2}$  blackish; at apex of second subsegment whitish-ochreous with a black basal line produced into a small posteriorly-directed tornal scale-tooth; on dorsum whitish-ochreous, a small blackish wisp beneath base of second cleft, cilia beyond this darker. [N.B.—The cilia on the forewing are in very good order, and there is no sign of there ever having been a scale-tooth beneath the base of the first cleft.]

Hindwing cleft from about  $\frac{2}{3}$  and from near base, segments linear; bright ferruginous-golden slightly suffused with light-ferruginous. Cilia whitish-ochreous; third segment with a large apical blackish-ferruginous scale-tooth on both margins, a few small scattered black scales on fore-margin, and a small blackish tooth on dorsum slightly before  $\frac{1}{2}$ .

*Habitat*.—Zeller's original specimens, one of which I have examined, were from Java. The only other examples which I have seen are two from Queensland in Lord Walsingham's collection, one from Cedar Bay (*Meek*, 1894), the other—very worn and possibly not really *tengstroemi*, its condition making its identification doubtful—from Geraldton, near Cairns (*Meek*, 1894).

*Deutrocopus atrapex*, Fletcher.

(Plate XLIV, fig. 5.)

*Deutrocopus atrapex*, Fletcher, *Spolia Zeylanica*, vol. vi, p. 19 (1909).

*Deutrocopus tengstroemi*, Meyrick, T.E.S., 1907, 474 (*nec* Zeller).

? *Deutrocopus tengstroemi*, Pagenstecher, *Abh. Ges. Zool.*, xxix, 241 (*nec* Zeller).

In my original brief description I had confused this species with *D. lophopteryx* and therefore I now give the following redescription of the type of *D. atrapex*:—

♂. Exp. 13 mm. Palpi erect, smoothly-scaled, sickle-shaped, reaching vertex; third joint about one-half length of second, acuminate; whitish-ochreous, banded with ochreous-brown at joints. Head dark-brown sprinkled with dark-ochreous; a few anteriorly-erected scales on crown. Haustellum well developed. Antennae



ferruginous-brown with a series of whitish dots above. Thorax golden-ferruginous, wholly suffused with dark-brown; pectus whitish. Abdomen rather stout, golden-ferruginous lightly suffused with dark-brown, across third segment a broad transverse dark-brown bar ill-defined posteriorly and tending to be continued as a short subdorsal stripe on either side; anal tuft short, concolorous with abdomen; venter whitish with a ferruginous transverse bar across fourth segment. Foreleg: femur ferruginous; tibia short, ferruginous, banded with whitish at base and provided apically with a large flattened brush-like tuft of dark-ferruginous scales; tarsi-whitish, dark-ferruginous at apex of first joint and beyond  $\frac{1}{2}$  of third joint. Midleg ferruginous: tibia with a large apical tuft of dark-ferruginous scales below which projects a pair of moderate spurs; tarsi lined with whitish above, first tarsal joint incrassated apically with short divergent posteriorly-projecting spinous hairs. Hindleg bright golden-ferruginous minutely irrorated with blackish: tibia large and stout with whorls of scales at  $\frac{1}{3}$ ,  $\frac{2}{3}$  and apex, the second and third whorls subequal, much larger than first, and each emitting a pair of long whitish slightly curved spurs which are banded with blackish-ferruginous at their bases and before their apices and which are roughly haired all along their posterior edges; the inner proximal spur is slightly longer than the outer, those of the distal pair are equal and are each rather shorter than the outer proximal spur; tarsal joints with very small apical whorls of spinous hairs, these whorls decreasing in size on successive tarsal joints, second joint moderately, third and fourth heavily, suffused with blackish.

Forewing rather short, cleft from  $\frac{2}{5}$ , second segment again cleft from about  $\frac{1}{2}$  of its length, segments sublinear without any appreciable angles: bright golden-ochreous, suffused with ferruginous especially evident between  $\frac{1}{5}$  and  $\frac{2}{5}$ : extreme base of wing blackish, a whitish subcostal patch at  $\frac{2}{5}$ ; first segment wholly black, cut at  $\frac{1}{4}$  of its length by a narrow transverse ferruginous fascia most evident costad; second segment sharply cut at base by a line extending obliquely outwards from base of cleft to dorsum, the whole area outside of this line (and including both subsegments) wholly black. Cilia golden-ochreous on costa, ferruginous opposite ferruginous suffusion and with traces of three pale-ferruginous patches (sometimes well marked) between  $\frac{1}{5}$  and apex; at apex black; on hinder-margin of first segment blackish with a few heavy black scales towards base, at  $\frac{1}{5}$  a moderate patch of pale-ochreous and a narrow patch of pale-ochreous just before termen, where the cilia are black at their base and pale-ochreous apically; on fore-margin of second segment blackish; on termen of first subsegment pale-ochreous, blackish at their base around apex of subsegment; within second cleft blackish;

at tornus pale-ochreous; blackish at their base; on dorsum ochreous-yellow with a small blackish scale-tuft at  $\frac{2}{3}$  (beneath base of first cleft), blackish beyond  $\frac{1}{3}$ .

Hindwing cleft from about  $\frac{2}{3}$  and  $\frac{1}{3}$ , segment linear: golden-ferruginous irrorated with blackish. Cilia pale-ferruginous, darker around apices of segments and at  $\frac{1}{2}$  on hinder-margin of second segment, third segment with a large terminal patch of blackish scales occupying exterior fourth of both margins, a small black scale-tooth on dorsum at  $\frac{1}{2}$ , and a few scattered blackish scales on anterior margin.

TYPE ♂, No. 6650, in Bainbrigge Fletcher Coll.: CEYLON, Central Province, Kandy (1600 feet), May 1907 (*E. Ernest Green*).

I have examined examples from the following localities:—

CEYLON—C. Prov., Kandy, May 1907 (*E. E. Green*) [Fletcher Coll., No. 6650, Type *atrax*]; S. Prov., Galle, June 19, 1908 (*Fletcher*), one.

ASSAM—Khasi Hills, Dec. 1906 [Meyrick Coll., one].

SELANGOR—Batu Estate, July 27, 1902 (*H. E. Durham*) [Brit. Mus., one].

TENASSERIM—Mergui, 1888 (*Doherty*) [Wlsm. Coll., one].

S. E. BORNEO—Pulo Laut, 1891 (*Doherty*) [Wlsm. Coll., one].

TERNATE—1892 (*Doherty*) [Wlsm. Coll., one].

AMBOYNA—1892 (*Doherty*) [Wlsm. Coll., seven].

BATIAN—August 1897 (*Doherty*) [Wlsm. Coll., one].

S. CELEBES—low country, 1896 (*Doherty*) [Wlsm. Coll., one]; Macassar, 500 feet, 1891 (*Doherty*) [Wlsm. Coll., one].

SANGUIR—1892 (*Doherty*) [Wlsm. Coll., one].

OMBAY (= Allor)—Oct., Nov. 1891 (*Doherty*) [Wlsm. Coll., two].

HALMAHERA—Patani, 1897 (*Doherty*) [Wlsm. Coll., one].

NEU POMMERN—Kinigunang (*C. Ribbe*) [Wlsm. Coll., one example labelled "*tengstroemi* topotype," so that *atrax* may be the species recorded from Kinigunang by Pagenstecher as *tengstroemi*, Z.].

N. NEW GUINEA—Dorey, 1897 (*Doherty*) [Wlsm. Coll., one].

KEI ISDS.—Little Kei Id., April 23, 1898 [Meyrick Coll., one].

D'ENTRECASTEAUX ISDS.—Fergusson Id., Sept. 8-30, 1894 (*Meek*) [Wlsm. Coll., two].

*Deutero copus lophopteryx*, n. s.

(Plate XLIV, fig. 6.)

*Deutero copus atrapev*, Fletcher, Spolia Zeylanica, vi, pp. 18-19 (*partim*).

♀. Exp. 12 mm. Palpi erect, slender, smoothly-scaled, third joint about half length of second; ferruginous, banded with darker apically; third joint ochreous-whitish broadly banded with blackish beyond base and at apex. Head brownish-ferruginous, back of head with some anteriorly-erected scales. Haustellum well developed. Antennae minutely ciliated (about  $\frac{1}{4}$ ), dull ferruginous, annulated with darker. Thorax dark brown; pectus whitish. Abdomen rather stout, dark ferruginous-brown with a narrow darker dorsal line, first segment whitish-ochreous dorsally, second segment with divergent submedian whitish-ochreous patches, fifth, seventh and eighth segments with small submedian whitish patches; venter whitish with a blackish bar across fourth segment. Foreleg pale-ferruginous dusted with whitish; tibia with a large apical flattened tuft of blackish scales; tarsus darker apically. Midleg pale-ferruginous; tibia with a large apical tuft of blackish scales beneath which projects a pair of moderate spurs; tarsus lined with whitish above, darker posteriorly. Hindleg ochreous-whitish heavily dusted with dark-golden-ferruginous; tibia large and stout, provided at  $\frac{1}{3}$ ,  $\frac{2}{3}$  and apex with whorls of blackish-coppery scales, of which whorls the second and third are subequal and larger than the first and each emits a pair of long slightly-curved blackish-brown spurs banded with whitish at middle and at apex and moderately clothed with short hairs on their posterior edges; of these spurs, the inner proximal spur is longer than the outer proximal, both these being longer than either spur of the distal pair which are equal in length.

Forewing short, cleft from  $\frac{2}{5}$ , second segment again cleft from  $\frac{2}{3}$  of its length; segments narrow, sublinear: golden-ferruginous much suffused with blackish-brown: a whitish patch before base of cleft surrounded by a more extended area of golden-ferruginous scales; first segment with a small ill-defined patch of lighter scaling at  $\frac{1}{3}$  of its length and a minute white dot at  $\frac{2}{3}$ ; both subsegments with a minute white dot at  $\frac{1}{2}$  of their length. Cilia pale-yellow on costa with a projecting patch of long black hair-scales at  $\frac{2}{3}$ , black between  $\frac{2}{3}$  and apex but tipped with ochreous immediately before apex; on hinder-margin of first segment black with a moderate pale-ochreous wisp at  $\frac{1}{2}$  and a narrow pale-ochreous wisp before termen; on fore-

margin of second segment black with a small pale-ochreous wisp at  $\frac{1}{2}$ , on termen blackish, black at base of cilia, the black continued around apex as a small posteriorly-projecting scale-tuft; on hinder-margin of first subsegment black with a pale-ochreous preterminal wisp; on foremargin of second subsegment black, tipped with pale-ochreous on termen; on dorsum pale-ochreous with a broad blackish wisp at  $\frac{2}{3}$  and small black scale-tufts at  $\frac{3}{4}$  (beneath base of first cleft) and at apex.

Hindwing cleft from about  $\frac{2}{3}$  and  $\frac{1}{2}$ , segments linear: golden ferruginous, thickly suffused with blackish. Cilia blackish, a broad pale-ochreous wisp on hinder-margin of second segment at  $\frac{1}{2}$ , on third segment pale-ochreous; third segment with a large black scale-tooth occupying exterior fourth of both margins and a moderate black scale-tooth slightly before  $\frac{1}{2}$  of dorsum.

TYPE ♀ (No. 6652) in Bainbrigge Fletcher Coll.: CEYLON, Central Province, Kandy (1600 feet), May 1907 (*E. Ernest Green*).

Besides the type I have seen thirteen other specimens from the following localities:—

CEYLON—C. Prov., Kandy, May 1907 (*Green*) [Fletcher Coll., one]; Maskeliya (4000 feet) [de Mowbray Coll., one]; S. Prov., Yala, Feb. 9, 1909 [Fletcher Coll., one].

AMBOYNA—1892 (*Doherty*) [Wlsm. Coll., seven].

SANGUIR—1892 (*Doherty*) [Wlsm. Coll., one].

S. CELEBES—Macassar (500 feet), 1891 [Wlsm. Coll., one].

HALMAHERA—[Wlsm. Coll., one labelled "Bernstein, Noord Halmaheira (Zell. Coll.)"].

*Deutero copus albipunctatus*, n. s.

*Deutero copus albipunctatus*, Wlsm. MS. (*ined.*).

(Plate XLIV, fig. 7.)

♂. Expanse 12 mm. Palpi erect, smoothly-scaled, third joint shorter than second; golden-ochreous, ringed with ferruginous before apex of second joint and at base and apex of third joint. Head golden-ochreous, top of crown with some anteriorly-erected scales. Thorax golden-ochreous, suffused with ferruginous; pectus whitish. Abdomen ferruginous-golden (details obscured by mould), anal tuft ferruginous; venter whitish, fourth segment thickly flecked with golden. Foreleg golden-ferruginous, tibia dilated with an apical scale-tuft, tarsus lined with whitish above. Midleg ferruginous-

golden; tibia with a large projecting apical scale-tuft beneath which is emitted a pair of moderate spurs of which the inner is the longer; tarsus light golden-yellow. Hindleg ferruginous-golden: tibia with a small whorl of scales at  $\frac{1}{3}$ , and at  $\frac{2}{3}$  and apex larger subequal whorls each emitting a pair of long spurs which are banded with whitish on their second and exterior fourths and very slightly rough-haired on their posterior edges, tibia banded with whitish beyond first and second whorls; tarsus with decreasing posteriorly-directed tufts of spinous hairs on apices of tarsal joints, first and third joints whitish on their basal halves.

Forewing cleft from within  $\frac{2}{5}$ , first segment narrow, second segment again cleft from about  $\frac{1}{4}$  of its length, subsegments linear: ferruginous-golden: a small longitudinal discal dash at  $\frac{1}{3}$ , a transverse whitish area at base of cleft, costal area suffused with ferruginous to beyond  $\frac{1}{2}$ ; first segment cut at  $\frac{1}{3}$  by an ill-defined inwardly-oblique whitish bar, at  $\frac{2}{3}$  by an ill-defined outwardly-oblique whitish line and with a minute whitish dot on hinder-margin at  $\frac{2}{5}$  of its length; second segment with a whitish spot at base of second cleft; first subsegment crossed at  $\frac{1}{2}$  and at apex by narrow whitish bars; second subsegment cut at  $\frac{1}{2}$  by a narrow whitish bar. Cilia on costa ferruginous to  $\frac{2}{3}$ , opposite first white bar paler preceded and followed by blackish, on exterior fourth of costa ferruginous-golden; on apex blackish; on hinder-margin of first segment pale golden-ochreous, with dark-ferruginous scales beyond  $\frac{1}{5}$  and  $\frac{2}{5}$ , between  $\frac{2}{5}$  and  $\frac{3}{5}$  ferruginous, and with a narrow wisp of ferruginous before apex; on fore-margin of second segment pale golden-ochreous, on outer third of segment ferruginous; around apex of first subsegment pale golden-ochreous, with a narrow ferruginous posteriorly-directed scale-tuft beneath apex; on hinder-margin of first subsegment pale golden-ochreous, with a ferruginous wisp beyond  $\frac{1}{2}$ ; on fore-margin of second subsegment pale golden-ochreous, beyond  $\frac{1}{2}$  ferruginous; on tornus pale golden ochreous; on dorsum pale golden-ochreous, suffused with ferruginous at about  $\frac{1}{4}$  and with a narrow ferruginous posteriorly-directed scale-tuft beneath tornus.

Hindwing cleft from about  $\frac{2}{5}$  and from near base, segments linear; bright ferruginous-golden. Cilia greyish-golden; apex of third segment surrounded by a large spatulate tuft of ferruginous scales occupying exterior fourth of both margins, dorsum with a large tuft of ferruginous scales at about  $\frac{1}{2}$ .

TYPE ♂ in Walsingham Coll.; JAPAN, Naga, Tokei.

A second specimen, also in Lord Walsingham's collection (No. 62353), was collected in Korea by Ito in 1887 (*ex* Leech Coll.).

The National Collection also contains an example from the Snowy Valley, near Chekiang (*W. B. Pryer*).

*Deuterocopus socotranus*, Rebel.

(Plate XLIV, fig. 8.)

*Deuterocopus socotranus*, Rebel, Denk. Math-Nat. Ak. Wiss., lxxi, part ii, 85-87 (1907).

*Deuterocopus tengstroemi* (*acc* Zeller), Meyrick, T.E.S., 1886, 8 (*partim*); Meyrick, J. Bomb. N.H.S., xvii, 134; Fletcher, Spol. Zeylan., vi, 16-20.

*Deuterocopus mathewi*, Wlsm. MSS. (*inéd.*).

*Deuterocopus jacksoni*, Wlsm. MSS. (*inéd.*).

This dingy little short-winged species, which seems to be one of the most widely-distributed members of its genus, appears to have been first collected in New Guinea by G. F. Mathew in 1884, and in the same year Lord Walsingham stated (*Notes Leyden Mus.*, vi, 243) that he had lately received specimens from West Africa. Under these circumstances it is perhaps somewhat unfortunate that its first validly published name should have been derived from its occurrence within the circumscribed area of Sokotra.

In some examples there is a great extension of the white scaling on the forewing, giving at first sight a different facies, but this variation appears to be confined to individuals and not to coincide with geographical distribution.

Professor Dr. Rebel, who has very kindly compared some Sinbalese examples with the original types of this species from Sokotra, writes that in all essential points they are in full agreement and that he considers the two forms as conspecific, although he adds that in *socotranus* the palpi appear slightly longer and the coloration a little darker (less bright red-yellow). This latter point is unimportant, but the slight difference in the length of the palpi, if constituting a constant difference between the two forms, may perhaps indicate that we are here dealing with true local races (incipient new species); at present, however, I think that we must look on these races (from South and West Africa, Sokotra, Ceylon, etc.) as only forming a single "species" in the ordinary acceptance of that word.

The following is a translation of Prof. Dr. Rebel's original description of *D. socotranus* :—

“♂ ♀. Of this distinct genus, whose hitherto known representatives belong to the Oriental and Papuan Regions, Prof. Simony brought back from Sokotra three specimens (♂ ♀) of a new species, and of these the least good specimen was sacrificed to the design of making a microscopic preparation of the neururation. The specimens were obtained on January 11, 1890, in the mangrove-swamps in Western Sokotra by beating the flowers of *Avicennia marina*.

“Since hitherto there has only been published a short account of the system of neururation by Meyrick (T.E.S., 1886, 8), and that in many respects not concordant with the aforesaid preparations, nor has a figure of the insect or a sketch of its neururation been published before, both are here given for the first time. [Dr. Rebel has evidently overlooked Zeller's figures in Bull. Soc. Mosc.—T. B. F.]

“The genus is easily distinguished by the thickset build of the abdomen and the short antennae, which in the ♂ are somewhat roughly scaled towards the tip. The face is closely scaled, the palpi are slender, their pointed terminal joint half as long as the curved middle-joint. The legs also are unusually short and stout, the tibiae with knot-like dilatations of scales, on the fore-tibia only at the apex, on the mid-tibia at  $\frac{1}{2}$  and apex, on the hind-tibia at  $\frac{1}{4}$  and also at the origin of both pairs of the very long spurs. The apices of the tarsal joints also are more moderately dilated with scales, only the terminal joints remaining bare.

“The lower fissure of the trifold forewing does not reach so far basewards as the upper one. The lengths of both clefts are in the proportions of 3:2. In the neururation of the forewing, the discal cell is not closed and veins 5 and 6 are so far wanting that they are reduced to a quite short termination running into the first cleft. Veins 8 and 9 are long-stalked. Vein 10 arises separate from these, vein 11 remote from 10.

“In the hindwing the third segment is only half as long as the first, the cleft between the first and second segments is to the greatest length of the hindwing as 27:43. In this wing also the cell is not closed, vein 2 also is wanting [the figure, however, clearly shows that 2 is present and that it is vein 3 which is absent.—T. B. F.], vein 3 does not reach as far as the apex of the second segment, whose main support is formed by vein 4, 5 and 6 are much reduced, vein 7 traverses the first segment to its apex, vein 8 is free.

“Meyrick (*l. c.*), who must have described the neururation after only slight clarification, makes veins 2 and 4 of the forewing arise from the angle of the cell (which scarcely agrees with the present species), vein 3 wanting, 5 and 6 very short, vein 11 arising near 10. In the hindwing vein 3 is wanting, according to his account.

“Unless another system of neururation be admitted for the example

of *Deuterocopus tengstroemi* (probably from Java) examined by him, there appears to be an error on his part easily arising under the above-mentioned circumstances.

“So far as at present concerns the species from Sokotra, in any case it stands very near to both the hitherto-described species, namely *tengstroemi*, Z., and *rubrodactylus*, Pag. Perhaps upon the whole we have to admit of only one widely-distributed species which has formed local races.

“In this species also the general coloration is a bright rusty-brown, the antennae ringed with black-brown towards the base. The second and third palpal joints with broad central bands. The pectus is whitish, especially laterally. The ground-colour of the legs is also really whitish with increasing thicker rusty-brown irroration towards the ends of the joints, noticeably on the tibial dilata-tions. The inner side of the hind-femur as well as the ventral surface of the abdomen is pure white, the latter with brown edging to the segments in the ♀ only. The naked, very long spurs of the hind-tibiae are white with a blackish central band especially distinct on their inner side and blackish tips. Head and thorax thickly sprinkled with rusty-brown, the abdomen much lighter at the base, yellowish, in the ♂ less thickly sprinkled with rust-brown, in both sexes with light margins to the segments. The anal tuft of the ♂ seems to cover a long uncus.

“The rust-brown irroration of the forewing is in the ♀ much more uniform, in the ♂ strongly intermixed with light yellowish scales. Beyond the cleft there lies in the first segment a constantly distinct pale (yellowish) transverse bar, which terminates on the costa as pure white. Before and beyond this the first segment is more or less suffused with blackish. On the hinder-margin of the first segment the cilia are broadly suffused with blackish and they are also blackish beneath the apex. The first subsegment shows in the ♂ a distinct yellowish patch before  $\frac{1}{2}$ , and beyond this the cilia on both margins are blackish. On the apex [of the first subsegment] lies a deep-black scale-tuft which is surrounded with white posteriorly. The second subsegment is darker, without markings, with broad black cilia on both margins; here also a black point occurs on the apex.

“The segments of the hindwing are rusty-brown with lighter cilia glistening-yellowish basally, the third segment with a small black ciliary scale-tuft in the middle of the dorsal margin and a similar broad apical scale-tuft surrounding both margins.

“The under-side of the wings is red-brown with a white-yellow costal spot at the termination of the transverse band of the upper side and a small bright-yellow spot before the apex of the first segment. Length of forewing 4.5 mm., expanse 9.5 mm.



“Distinguished from *Deuterocopus tengstroemi* by the non-hairy hinder-tibial spurs and the not bright rust-yellow costal cilia of the first segment, from *Deuterocopus rubrodactylus* by the obvious scale-thickening at the end of the fore-tibia.

“As already remarked, it may be that the three described forms of *Deuterocopus* (*tengstroemi*, *rubrodactylus* and *socotranus*) are only local races of one species, but that can only be proved by comparison of sufficient material.”

As regards the figure of *D. socotranus* given by Dr. Rebel, it is particularly to be remarked that the slight scale-tuft in the dorsal cilia of the forewing beneath the base of the first cleft has been omitted in error; this tuft is actually present in the specimens themselves.

The following is a general description of the species:—

Expanse 9-10 mm. Palpi erect, third joint about half length of second; very pale-ferruginous, apices of joints banded with darker. Antennae above blackish dotted with white, beneath pale-ferruginous. Head and thorax dark brownish-ferruginous, intermixed with darker and lighter scales; pectus white. Abdomen dark ferruginous-brown, first two segments ferruginous-ochreous variably mixed with whitish, third segment edged posteriorly by a transverse raised bar of whitish-ochreous scales, fourth, sixth and seventh segments with narrow submedian longitudinal whitish stripes; ventral surface white, fourth segment edged posteriorly with red-brown. Legs ferruginous-brown, paler or whitish towards base and on tarsi: fore-tibia with acuminate scale-tuft on apex; mid-tibia with apical scale-tuft and a pair of long spurs; hind-tibia with moderate whorl of scales at  $\frac{1}{3}$  and larger whorls at  $\frac{2}{3}$  and apex, these two whorls emitting each a pair of long, naked spurs which are banded with blackish before apex; the posterior edges of these whorls of scales are usually paler or whitish and the hind-tibia is more or less banded with whitish beyond first and second whorls; posterior tarsus with first, third and fourth joints, banded with paler or whitish.

Forewing cleft from about  $\frac{3}{8}$ , first segment moderately broad, second segment again cleft from about  $\frac{1}{4}$  of its length: very dark brownish-ferruginous intermixed with paler or whitish scaling sometimes forming a patch at base of first cleft: costal area suffused with pale-ochreous, especially evident at about  $\frac{1}{2}$ ; first segment cut at about  $\frac{1}{3}$  by an inwardly-oblique transverse whitish line preceded by pale-ochreous, at  $\frac{2}{3}$  by a similar but more distinct white line not reaching costa, segment beyond this much suffused with pale-

ochreous; both subsegments cut at about  $\frac{1}{2}$  by transverse white lines. (Note.—All the white markings on segments appear to be variable in extent of development.) Cilia on costa ochreous, blackish-ferruginous above base and middle of first segment; on apex blackish; on termen pale-yellowish; on hinder-margin of first segment pale-yellowish to  $\frac{1}{2}$ , beyond that blackish, with a small black posteriorly-directed scale-tooth beneath apex preceded by a narrow ochreous wisp; on upper margin of first subsegment pale-yellowish mixed with white, beyond  $\frac{2}{3}$  blackish continued around apex of subsegment to a small posteriorly-directed scale-tooth beneath apex, on lower-margin pale-yellowish to  $\frac{1}{2}$ , beyond that blackish; on upper margin of second subsegment pale yellowish mixed with white to about  $\frac{1}{2}$ , beyond that blackish; on dorsum pale-yellowish, with a small blackish scale-tuft at about  $\frac{2}{3}$  (slightly beyond base of first cleft), blackish on outer  $\frac{2}{3}$  of second subsegment.

Hindwing cleft from about  $\frac{2}{3}$  and from near base, segments linear: brownish-cupreous-ferruginous. Cilia pale-yellowish, darker on outer half of wing; third segment with a small blackish scale-tooth on dorsal margin slightly within  $\frac{1}{2}$  and a large apical blackish-ferruginous scale-tooth on both margins.

*Larva*.—The larva feeds in Ceylon on the flowers of the square-stemmed jungle vine (*Vitis quadrangularis*) so characteristic of the dry districts of that island. The following is a brief description made on October 20, 1908, from a living larva found at Hambantota:—

Length 7 mm., stout, stoutest at about mid-length, decreasing rapidly anally; head capable of retraction into or under prothorax.



FIG. 3.—*Deut. socotranus*.

Incisions between segments distinctly marked. Colour a uniform pale-green; head yellowish-brown and prothorax dark blackish-purple. Prothoracic legs purple, other legs and prolegs pale-green; legs and prolegs rather short and stout. To the naked eye no hairs are visible except two pairs of short whitish curved hairs on the anal segment and a pair of short submedian hairs, directed forward, on each thoracic segment. Spiracles high-placed, about half-way up the side, fairly conspicuous from being outlined in a slightly lighter green tint than that composing the general colour of the larva.

Movements slow and deliberate, spinning a thread as it moves along and when it drops. Under the microscope the skin is seen to be covered with minute skin-points as if shagreened.

*Pupa*.—The pupa is attached to a flower, flower-stalk or stem of the food-plant, or more rarely to a leaf of the same, and is usually enclosed in a very flimsy cocoon composed of a few silken threads. It is possible however that these threads are merely fortuitous, having been spun by the larva during its search for a suitable pupation-place or whilst preparing its cremastral pad. The pupa is about 6 mm. long, stout, smooth, rounded and blunt at the capital extremity. Its usual colour is a pale apple-green, marked



FIG. 4.—*Deut. socotranus*.

with dark- or purplish-red on the dorsal surface, the markings usually consisting of (i) a narrow median thoracic stripe broadening posteriorly into a transverse bar extending obliquely downwards to about the edge of the wing-covers, and (ii) a series of submedian patches on the second to fifth abdominal segments forming a more or less interrupted longitudinal stripe. Some pupæ, however, which had pupated in my boxes, were wholly of a dark-grey colour. The moth emerges in the early morning.

*Distribution*.—As already remarked, the geographical range of this species is very wide. Localities known to me are:—

WEST AFRICA — Gambia, Bathurst, 1885–87 (*Carter*)  
[Wlsm. Coll., four].

SOUTH-EAST AFRICA—Delagoa Bay, 1884 (*Druce*) [Wlsm.  
Coll., three].

EAST AFRICA—Ibea, Ukambani, Dec.–Jan. 1889 (*Jackson*)  
[Wlsm. Coll., No. 6330, one ♂, type of *jacksoni*,  
Wlsm. MS.].

SOKOTRA — Western Sokotra, Jan. 11, 1890 (*Simony*)  
[Vienna Mus., ♂ and ♀ types of *socotranus*, Rbl.].

INDIA—Ganjam, Aug. 1882 (*Minchin*) [Wlsm. Coll., one];  
Bombay, Surat (*Lefroy*) [Meyrick Coll.].

- CEYLON—N. W. Prov., Puttalam, Feb. 1890, March 1902 (*Pole*) [Wlsm. Coll., four]: E. Prov., Trincomali, July 20, 1890 [Brit. Mus., one]: S. Prov., Hambantota, abundant in Oct. and Nov. 1908, about seventy (*Fletcher*); Yala, larvae common Feb. 9, exc. Feb. 20, 1909, five (*Fletcher*): Uva Prov., Madulsima, Cocogalla Estate, 4000 feet, Oct. 1907 and Jan. 1908 (*W. Vaughan*) [Fletcher Coll., two].
- SUMBA—below 2000 feet, 1896 (*Doherty*) [Wlsm. Coll., two].
- TAMBORA—low country, 1896 (*Doherty*) [Wlsm. Coll., one].
- AMBOYNA—1892 (*Doherty*) [Wlsm. Coll., one].
- NEW GUINEA—Port Moresby, 1884 (*G. F. Mathew*) [Wlsm. Coll., two specimens including No. 2287, type ♀ *mathewi*, Wlsm. MS.] [Meyrick Coll., one]; Humboldt Bay, April 18, 1893 (*Doherty*) [Wlsm. Coll., three].
- QUEENSLAND.—Townsville (*Dodd*) [Meyrick Coll.].

*Deuterocopus bathychasma*, n. s.

(Plate XLIV, fig. 9.)

♀. Expanse 15 mm. Palpi upturned, smoothly-scaled, third joint about half length of second, second joint somewhat enlarged apically, third slender, acuminate; golden-ferruginous, ringed with whitish-ochreous. Head golden-ferruginous, with some anteriorly-erected scales on back of crown. Antennae golden-ferruginous, lined above with whitish, extreme tips whitish. Thorax golden-ferruginous with some whitish-ochreous scales intermixed: pectus whitish. Abdomen rather stout, light golden-ferruginous, with a few whitish scales tending to form longitudinal lines especially evident laterally: venter whitish, fourth segment with a transverse ferruginous bar. Foreleg golden-ferruginous; tibia short, with an apical tuft of scales. Midleg golden-ferruginous; tibia with an apical scale-tuft emitting a pair of moderate spurs. Hindleg bright golden-ferruginous: tibia stout, with whorls of whitish-tipped scales at  $\frac{1}{3}$ ,  $\frac{2}{3}$  and apex; tibial spurs long, strong, slightly curved, ferruginous, ochreous-whitish in centre and apically, thickly clothed with short hairs on posterior edge; the distal spurs are slightly unequal, the inner being the longer.

Forewing rather short, cleft from slightly within  $\frac{2}{3}$ , second segment again cleft from rather within  $\frac{1}{4}$  of its length; first segment narrow, subsegments linear: bright golden-ferruginous: base of wing slightly suffused with blackish tending to form longitudinal

lines before base of cleft, a white dot in disc at  $\frac{1}{3}$ , another slightly before and above base of cleft, and a third before base of second cleft; first segment with a white dot at  $\frac{1}{3}$  and another on its hinder-margin at  $\frac{2}{3}$ , exterior half blackish-suffused; both subsegments with a white dot a little beyond  $\frac{1}{2}$ , outer third of first subsegment and whole of second subsegment blackish-suffused. Cilia golden-ferruginous: on costa blackish at about  $\frac{2}{5}$  and  $\frac{3}{4}$ ; on hinder-margin of first segment with a few scattered black scales basally, a blackish-brown wisp at  $\frac{2}{3}$  and a small black preapical scale-tuft; on fore-margin of second segment blackish-brown beyond  $\frac{2}{5}$ ; apex of first subsegment with a small blackish posteriorly-directed scale-tuft; hinder-margin of first subsegment with a small blackish-brown scale-tuft at  $\frac{2}{3}$ ; foremargin of second subsegment blackish-brown beyond  $\frac{2}{3}$ ; on dorsum with a small brownish-ferruginous scale-tuft at  $\frac{2}{3}$  (below base of first cleft), a dark-brown wisp along middle third of second subsegment, and a small blackish toral scale-tuft.

Hindwing cleft from about  $\frac{2}{5}$  and  $\frac{1}{2}$ ; bright golden-ferruginous. Cilia golden-ferruginous; third segment with a large scale-tooth occupying exterior fourth of both margins, a moderate triangular dorsal scale-tooth at about  $\frac{1}{2}$ , and a few scattered scales on fore-margin.

TYPE ♀ (No. 42084) in Walsingham Coll.; SUMBAWA, Tambora (3000 feet), 1896 (*Doherty*).

Co-type (No. 8528) in Bainbrigg Fletcher Coll., also collected by Doherty in Tambora (3000 feet).

Two other examples in Lord Walsingham's collection are from Batian (August 1897; *Doherty*) and from Kapaur, S.W. New Guinea (sea-level to 2000 feet; Dec. 1896—c. February 1897; *Doherty*).

*Deutrocopus planeta*, Meyr.

(Pl. XLIV, fig. 10.)

*Deutrocopus planeta*, Meyrick, T.E.S., 1907, 473-4.

*Deutrocopus rubrodactylus*, Fletcher (*nee* Pag.), Spolia Zeylan., vi, 20, t. E., f. 7.

I am indebted to Mr. E. Meyrick for the opportunity of examining the type of this species of which his original description runs as follows:—

“♂. 10-11 mm. Head and thorax deep ferruginous, sprinkled with yellow-whitish. Palpi ferruginous, with several whitish rings. Antennae whitish, with a biserrate fuscous line. Abdomen whitish-

yellow, above with three suffused stripes and several transverse bands ferruginous, third segment with a semicircular silvery-white spot on posterior margin, anal valves and tuft very long and slender. Legs ferruginous ringed with whitish, posterior pair with whorls of expanded scales at origin of spurs and apex of tarsal joints. Forewings cleft firstly from  $\frac{2}{3}$  [? misprint for  $\frac{3}{4}$ ], secondly from  $\frac{2}{3}$ , first segment narrow, second and third linear; deep ferruginous, sprinkled with whitish-yellowish; undefined slender irregular white bars on first segment before  $\frac{1}{3}$  and beyond  $\frac{2}{3}$ , before base of second cleft, and on middle of second segment: cilia pale-ferruginous, on costa mostly dark-fuscous, with dark-fuscous bars at apex of segments, and dark-grey patches or bars on lower margin of first segment towards apex, upper margins of second and third segments towards apex, and lower margins of second and third segments about middle. Hindwings cleft firstly from  $\frac{1}{3}$ , secondly from near base, segments linear; ferruginous, first two segments suffused with dark-fuscous posteriorly; cilia light-ferruginous, third segment with a dot of one or two black scales on dorsum before its middle, and a moderate apical scale-tooth of black and ferruginous scales extending above and beneath.

“COORG (Kuti) (*Newcome*), ASSAM (Khasi Hills); in October and November; two specimens. Very similar to *rubrodactylus*, but the silvery-white spot on abdomen is an easy distinction. In *D. ritsemae*, Wals., the abdomen is also marked with white, but differently, according to the description.”

To the above description I would add that the ventral surfaces of the thorax and abdomen are pale-yellow, and that the white spot on the abdomen is often more or less obsolete. *D. planeta*, however, is easily distinguished from *ritsemae* or *rubrodactylus* by the greater length of the second cleft and by the absence of any scale-tuft in dorsal cilia of the forewing beneath the base of the first cleft.

EARLY STAGES.—These were briefly described by me in “*Spolia Zeylanica*” under the name of *rubrodactylus*, and for the sake of completeness the descriptions are here reproduced:—

*Ovum*.—The egg is about .44 mm. long by about .20 mm. broad; in shape it is ovo-cylindrical, the ends rounded and subequal, the micropylar area distinctly depressed; the surface is very smooth and shining, of a very pale-orange colour, suffused with red at either pole.

*Larva*.—A larva found at Galle on June 18, 1908, feeding on the flowers of *Leea sambucina* (Sinh. “Bouroula”) was described as—

"Pale-green without any markings except red suffusion at either extremity. The skin is roughened into minute knobs (like shark skin) everywhere, but especially on the ventral region. A distinct subsegment is formed on the posterior ventral region of abdominal segments. The hairs, except (i), are very short and inconspicuous; (i) is short, less than breadth of segments. The hairs are transparent whitish (glassy) and the tubercles very indistinct. The hairs are longest on thoracic and anal regions. The legs are extremely short and inconspicuous. There are no secondary hairs, these seeming to be reduced to skin-points or rather rugosities of the skin." A sketch of the arrangement of the tubercles was given in figure 7 of Plate E of the publication quoted.

*Pupa*.—A pupa, also found at Galle on June 18, 1908, was brown with a broad lighter ochreous-fuscous central band; very few hairs



FIG. 5.—*Deut. planeta*.

or projections. It was suspended anally to a flower-stalk within a slight attempt at a cocoon—a few silken threads spun around it to form a spacious but flimsy enclosure, in which the pupa was fully visible. The cast larval skin remained at the anal extremity of the pupa.

Specimens examined by me are from :—

ASSAM—Khasi Hills, Nov. 1906 [type of *planeta* in Meyrick Coll.].

BURMA—Bernardmyo, Ruby Mines (5000–7000 feet), June 1890 (*Doherty*) [Wlsm. Coll., one].

CEYLON—S. Prov., Galle, June 3, June 21, June 23, October 26, 1908 [Fletcher Coll., four].

PORTUGUESE TIMOR—1892, *Doherty* [Wlsm. Coll., one].

TENIMBER (= Timor Laut)—1892, *Doherty* [Wlsm. Coll., two].

NEW GUINEA—Little Kei Isd., April 11, 1897 [Meyrick Coll., one \*]; Feb. 2 and Feb. 14, 1900 (*H. Kühn*) [Brit. Mus. Coll., two].

*Deuterochopis ritsemac*, Wlsm.

(Plate XLIV, figs. 11, 12.)

*Deuterochopis ritsemac*, Wlsm., Notes Leyden Mus., vi, 243 (1884); Fletcher, Spol. Zeylan., vi, 21 (1909).

*Deuterochopis rubrodactylus*, Pag., Abh. Ges. Zool., xxix, 241.

? *Deuterochopis rubrodactylus*, Meyr., T.E.S., 1907, 473.

*Deuterochopis rubrodactylus*, Fletcher, Spol. Zeylan., vi, t. B, f. C (*nec l.c.*, p. 20).

Lord Walsingham's original description is as follows:—

“Head ferruginous, palpi ferruginous, annulated and tipped with white. Antennae dull ferruginous, delicately spotted along their upper side with white. Thorax ferruginous with two ill-defined yellowish-white spots anteriorly. Forewings bright shining ferruginous, with two white spots before the fissure, one on the dorsal margin nearer to the base than to the fissure, another on the middle of the wing nearer to the fissure than to the base, a brownish spot at the base of the fissure preceded by a few brownish scales: the costal lobe clouded about its middle, but not at its base, with bronzy-brown and having two blackish streaks on the costal margin and another at the extreme apex. The central bronzy-brown shade is preceded and followed by a silvery-white spot. The divided lobe is also somewhat clouded with bronzy-brown but not at its base, a silvery-white spot precedes the dark colouring and a second smaller one is about the middle of the upper division, a dark streak in the fringes at the apex of each division. In the pale yellowish fringes on the dorsal margin is a tuft of bronzy scales below the first fissure and another larger bronzy cloud below the second fissure. Hindwings dark-ferruginous with purplish tinge in the fringes especially towards the apex of the lobes; there is a small tuft of darker scales on the dorsal margin before the middle of the posterior lobe, a spatule of bronzy-brown scales at its apex. Abdomen bright ferruginous, with a raised band of shining silvery scales above the middle, a conspicuous yellowish-white spot preceding the anal segments. The posterior legs are bright-ferruginous, banded with white on the tibiae and first

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\* Mr. Meyrick does not agree that this specimen is conspecific with his type of *planeta*, but I have been unable to detect any difference of specific importance.



tarsal joint; with long tibial spurs also indistinctly banded, the raised tufts at their bases rather less conspicuous than in the allied *D. tengstroemi*. Under-side of thorax and abdomen very pale yellow; the anal tuft ferruginous.

“Expanse of forewings 11 mm.

“Java (Mulié); a single specimen.

“This species differs from *D. tengstroemi*, Z. . . . in the presence of the white spots and in the pale bases of the lobes of the forewings, also in the less thickly scaled posterior legs and in the absence of scales in the spurs themselves. . . .”

The following is a translation of Pagenstecher's original description of the form *rubrodactylus*:—

“In the Ribbe collection there are several specimens of a new species from Neu Pommern (Kinigunang) which is closely allied to the preceding (*D. tengstroemi*, Zeller [= ? *atrax*—T. B. F.]) and which Herr Snellen regards as *tengstroemi*. Dr. Hofmann, however, makes the following comments:—

“Does not agree with the description of *D. tengstroemi*, Zeller, *Linnaea Ent.*, vi, p. 402. The belly, the coxae, the sides of the pectus and the frontal area are bright sulphur-yellow, as is the upper-side of the two first segments of the abdomen. The forelegs have no scale thickening at the end of the tibiae and no spurs, as described for *tengstroemi*. [As already pointed out, Zeller's statement to this effect is evidently incorrect.—T. B. F.] The very long spurs of the hind tibiae are not thickened with hairs. Forewings brilliant red-brown, with black longitudinal spots and tips dusted with black. Three segments in the hindwing as in *tengstroemi*. The species should be easily recognisable by means of the characters here indicated.”

In spite of Dr. Hofmann's concluding remark, the above description is quite insufficient for the recognition of this form, and I have therefore drawn up the following description from one of Ribbe's original specimens now preserved in Lord Walsingham's collection and labelled as the type of *rubrodactylus* (No. 73186):—

♀. Expanse 12 mm. Palpi long, smoothly-scaled, erect; second joint whitish-ferruginous, broadly banded with dark-ferruginous at base and before apex; third joint acuminate, rather more than half length of second, whitish-ferruginous, broadly banded with dark-ferruginous at base and before apex. Antennae blackish-ferruginous, dotted with white above. Head ferruginous, summit of crown with

erected scales. Thorax golden-ferruginous, mottled with darker; pectus pale-yellow. Abdomen large and stout, golden-ferruginous sprinkled with darker; first two segments pale-yellow, third segment with indications of a whitish semi-circular spot on posterior margin preceded by darker, posterior margins of third and succeeding segments faintly outlined in whitish scaling; ventral surface pale-yellow. Foreleg whitish-ferruginous-golden, tibia with slight indication of scale-tuft at apex. Midleg bright ferruginous-golden, tibia lined with whitish beneath and banded with whitish before apex where a dark-ferruginous scale tuft emits a pair of short equal spurs; tarsi whitish. [Hindlegs broken.]

Forewing cleft from about  $\frac{2}{3}$ , first segment narrow, second again cleft from slightly beyond half its own length: bright ferruginous-golden: costa blackish to  $\frac{1}{4}$ , a short blackish shade along dorsum, a blackish longitudinal subcostal spot at  $\frac{1}{3}$ , a blackish suffusion along costa at  $\frac{1}{2}$  leading into first segment and broadly continued downwards into disc but not reaching dorsum; two black dots preceding cleft, one above base of cleft, the other below; first segment with costal area suffused with black to  $\frac{1}{5}$ , cut at  $\frac{1}{3}$  by an inwardly-oblique black line, area beyond this wholly black except for a small whitish dot on hinder-margin at  $\frac{2}{3}$ ; second segment with a longitudinal whitish spot at  $\frac{1}{4}$ , area beyond this (including both subsegments) suffused with blackish; first subsegment with a whitish spot at  $\frac{1}{3}$  of its length, second subsegment with a few whitish-ochreous scales near its base. Cilia on costa blackish, on first quarter of first segment ferruginous-golden; within cleft blackish, whitish-ochreous in central third and with a narrow pale-ochreous wisp at hinder-angle of first segment; on hinder-margin of first subsegment blackish to  $\frac{1}{2}$ , then whitish-ochreous to just before apex, where blackish; on fore-margin of second subsegment blackish; on dorsum blackish with black scale-tufts beneath base of each cleft, area between these tufts whitish-ochreous

Hindwing cleft from  $\frac{2}{3}$  and from near base; golden-ferruginous, first two segments suffused with blackish. Cilia blackish; on third segment whitish-ochreous with a large blackish-ferruginous apical scale-tooth on both margins, a few scattered blackish scales on fore-margin and a small blackish scale-tooth on dorsum slightly before  $\frac{1}{2}$ .

Although the two forms, *ritsemae*, Wlsm., and *rubrodactylus*, Pag., appear abundantly distinct when contrasted with one another, a long series soon reveals a complete gradation between them, nor does the development or suppression of the pure-white markings on the forewing and abdomen seem to follow the geographical distribution

of the species, specimens with these markings well developed or quite obsolete being found side by side in Assam, Ceylon, Batian, Tambora, etc.

I have examined 37 examples, as under :—

*In my own collection :—*

CEYLON—C. Prov., Peradeniya, July 1907 (*E. E. Green*), one; S. Prov., Galle, June 5, 1907, June 4–24, 1908, eight, including three bred specimens.

*In Lord Walsingham's collection :—*

ASSAM—Margherita, 1889 (*Doherty*), two.

TENASSERIM—Mergui, 1888 (*Doherty*), one.

S.E. BORNEO—Pulo Laut, 1891 (*Doherty*), one; Riam Kiwa, 500–1000 feet, 1891 (*Doherty*), one.

TAMBORA—low country, 1896 (*Doherty*), three; 3000 feet, 1896 (*Doherty*), three.

BATIAN—August 1897 (*Doherty*), eight.

BALI—1896 (*Doherty*), four.

TERNATE—1892 (*Doherty*), one.

HALMAHERA—Gani, 1897 (*Doherty*), one.

N. NEW GUINEA—Humboldt Bay, April 1893 (*Doherty*), two.

NEU POMMERN—Kinigunang (*C. Ribbe*), one (type of *rubroductylus*, Pag.).

*Early Stages.*—These are as yet practically unknown. The moth was bred by me from pupae found at Galle,

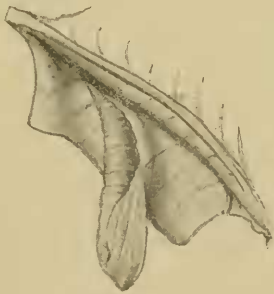


FIG. 6.—*Deut. ritsemæ*.

Ceylon, suspended anally from the upper surface of leaves of *Leea sambucina*, which is evidently the foodplant. The different method of suspension, as compared with the pupa

of *D. planeta*, is noteworthy. On the same bush I found a larva feeding inside an unopened flower-bud; it appeared to be very similar to that of *planeta*, but wanted the terminal red suffusion; unfortunately I failed to rear it.

LEPTODEUTEROCOPUS, n. g.

Labial palpi long, smooth-scaled, erect, sickle-shaped. Abdomen rather short and stout. Legs strong: posterior tibiae with tufts of



FIG. 7.—*Lept. citrogaster*.

spinous hairs at about  $\frac{1}{5}$ ,  $\frac{2}{5}$  and apex, second and third tufts each emitting a pair of long spurs. Forewing cleft from about  $\frac{2}{3}$ ; first segment rather narrow, without hinder-angle; second segment expanded posteriorly, again cleft from about  $\frac{2}{3}$  of its length. Hindwing cleft from about  $\frac{1}{2}$  and  $\frac{1}{3}$ ; second segment with a slight scale-tuft about centre of its hinder-margin; third segment with a large scale-tooth surrounding its apex and a small scale-tooth on dorsal margin nearer the base.

TYPE:—*L. citrogaster*.

The two species described below are readily separable by the following character:—

Dorsal cilia of f.w. with a large white pretornal patch . . . *sochchoroides*  
 Dorsal cilia of f.w. without a large white pretornal patch . . . *citrogaster*

The slightly different shape of the second cleft in these species may indicate a generic difference; otherwise they appear very closely allied, agreeing with one another and differing from *Deuteroecopus*, in the different positions of the scale-tufts on hind tibiae, the less deeply cleft hindwing, etc.

*Leptodeuteroecopus citrogaster*, n. s.

(Plate XLIV, fig. 13.)

♂. Expanse 14 mm. Palpi long, slightly curved, erect, smoothly scaled; second joint ferruginous-yellow, banded exteriorly before

apex with dark-ferruginous; third joint more than half length of second, acuminate, pale yellow, broadly banded at base and before apex with dark-ferruginous. Antennae dark-ferruginous, dotted above with pale-yellow. Head dark-ferruginous intermixed with paler, back of crown with long anteriorly-erected scales. Thorax dark-ferruginous; pectus pale-yellow. Abdomen large and stout, golden-ferruginous, pale-yellow on two basal segments; third segment edged posteriorly by a narrow band of large pale-yellowish scales, sixth segment pale-yellowish except narrowly on anterior margin; venter pale-yellow; anal tuft dark golden-ferruginous. Foreleg pale-ferruginous; tibia short with large apical tuft of dark-ferruginous scales. Midleg dark golden-ferruginous; tibia with apical scale-tuft emitting a pair of unequal spurs; tarsus whitish, ferruginous at apex of first tarsal joint and lightly suffused with ferruginous on fourth and fifth joints. Hindleg pale-yellowish; tibia large and stout with tufts of spinous hairs at about  $\frac{1}{5}$ ,  $\frac{2}{5}$  and apex, broadly suffused with ferruginous-golden above second and third tufts which each emit a pair of long slightly-curved spurs broadly banded with dark-ferruginous at base and before apex and roughly clothed with short hairs on their posterior edges.

Forewing cleft from about  $\frac{2}{5}$ , first segment rather narrow, second segment expanded posteriorly and itself cleft from  $\frac{3}{4}$  of its length, the second cleft as wide as deep: bright golden-ferruginous: basal  $\frac{2}{5}$  slightly irrorated with dark-brown; first segment preceded by a patch of blackish suffusion from costa to base of first cleft, cut at  $\frac{1}{3}$  by a narrow inwardly-oblique white line ended on hinder-margin of second as a small longitudinal white spot, outer half of segment lightly suffused with dark-brown; second segment lightly suffused with dark-brown, with whitish dots on dorsum near base and at  $\frac{3}{4}$  length of segment and a short white longitudinal streak on fore-margin at  $\frac{2}{3}$  length of segment, base of second cleft narrowly edged with blackish. Cilia on costa ferruginous-golden, on outer half of first segment blackish to just before apex; on lower margin of first segment ferruginous-ochreous, on terminal third blackish to apex; on fore-margin of second segment ferruginous mixed with blackish scales, apex of first subsegment with a small posteriorly-directed blackish scale-tuft; within second cleft pale ferruginous-ochreous; on dorsum ferruginous-ochreous, blackish beyond  $\frac{5}{8}$ , with a small tuft of blackish scales at about  $\frac{2}{3}$  (just beyond base of first cleft) followed by a broad wisp of pale ferruginous-ochreous and a small blackish scale-tooth at tornus.

Hindwing cleft from about  $\frac{2}{5}$  and from near base, golden-ferruginous irrorated with ferruginous. Cilia ferruginous-ochreous; second segment with a small blackish scale-tuft in centre of hinder-margin;

third segment with a large blackish apical scale-tooth on both margins, a few scattered blackish scales on fore-margin and a small black triangular dorsal scale-tooth at about  $\frac{1}{3}$ .

TYPE (No. 42125) and Co-type (No. 41929), both in Walsingham Coll. and both collected by Doherty in Amboyna in 1892.

*Leptodeuterocepus soehchoroides*, n. s.

(Plate XLIV, fig. 14.)

Sex ♂ (?). Expanse 13 mm. Palpi upturned, long, slender, smoothly scaled, reaching vertex; second joint long, sickle-shaped; third joint rather short, straight, acuminate: ferruginous-orange, banded at joints and striated exteriorly with yellowish-white. Antennae ciliate (about  $\frac{1}{3}$ ), blackish-fuscous, basal third lined above with short pale yellow streaks, apical portion wholly greyish. Head bright purplish-golden-reddish, with two lines of pale-yellowish scales between the eyes, one before and the other behind origin of antennae; eyes margined posteriorly with pale-yellow. (Abdomen broken.) Foreleg bright reddish-orange; tibia short, with two ill-defined pale-yellowish bands, apex dilated into a small blackish-tipped scale-tuft; tarsi darkened apically. Midleg pale-yellowish suffused and banded with golden-orange; tibia with a small golden-ferruginous scale-tuft before  $\frac{1}{2}$ , apex dilated with a small dark-golden-ferruginous tuft emitting a pair of long blackish white-banded spurs of which the inner is the longer; tarsi whitish, golden-fuscous at apices of joints. Hindleg golden-orange; tibia with a minute golden-ferruginous tuft at  $\frac{1}{5}$  and large tufts at  $\frac{2}{5}$  and apex, these two large tufts emitting pairs of long smoothly-scaled spurs of which those of the proximal pair are slightly unequal (the inner spur being the longer), those of the distal pair equal, areas between all these three tufts narrowly banded with pale-yellow; tarsi blackish-fuscous with a slight golden tinge, first two tarsal joints with small apical tufts of hair-scales.

Forewing rather long and narrow, cleft from about  $\frac{2}{3}$ , second segment again cleft from about  $\frac{2}{3}$  of its length: golden-ferruginous suffused exteriorly with reddish-fuscous: two ill-defined yellowish spots at  $\frac{2}{5}$  and  $\frac{3}{5}$ , the first costal, the second midway between costa and base of cleft, the space between them blackish-fuscous; first segment blackish on costa, with a silvery-white square spot on costa at  $\frac{1}{3}$  length of segment, a white dot in disc at  $\frac{1}{2}$ , an inwardly-oblique narrow white line from below costa to hinder-margin at  $\frac{3}{4}$  and a white costal dot in extreme apex; second segment broader than first, expanded posteriorly, with a shallow cleft on termen barely reaching





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SPECIES OF DEUTEROCOPUS.



## EXPLANATION OF PLATE XLIV.

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FIG. 1.	<i>Hexadactilia trilobata</i> , n. s. (Type).	Wlsm. Coll., No. 41944.
„ 2.	<i>Deuterocopus famulus</i> , Meyr.	„ „ „ 41960.
„ 3.	„ <i>melanota</i> , n. s. (Type).	„ „ „ 42101.
„ 4.	„ <i>tengstroemi</i> , Z. (Type ♀).	„ „ „ 2/2.
„ 5.	„ <i>atrapex</i> , Fletcher (Type).	Fletcher „ „ 6650.
„ 6.	„ <i>lophopteryx</i> , n. s. (Type).	„ „ „ 6652.
„ 7.	„ <i>albipunctatus</i> , n. s. (Type).	Wlsm. „ „ —
„ 8.	„ <i>socotranus</i> , Rbl.	Fletcher „ „ 7320.
„ 9.	„ <i>bathychasma</i> , n. s. (Type).	Wlsm. „ „ 42084.
„ 10.	„ <i>planeta</i> , Meyr.	Fletcher „ „ 7197.
„ 11.	„ <i>rubrodactylus</i> , Pag (Type).	Wlsm. „ „ 73186.
„ 12.	„ <i>ritsemae</i> , Wlsm.	Fletcher „ „ 7199.
„ 13.	<i>Leptodeuterocopus citrogaster</i> , n. s. (Type).	Wlsm. „ „ 42125.
„ 14.	„ <i>sochchoroides</i> , n. s. (Type). B.M.	„ „ „ 58/84.



